

## MICRONEEDLE DEVICES AND PRODUCTION THEREOF

### Abstract of the Disclosure

Microneedle devices and methods of manufacture are provided for transport of molecules or energy across or into biological barriers, such as skin. The device can comprise one or more microneedles formed of a first material and a second material, wherein the second material is dispersed throughout the first material or forms a portion of the microneedle. The first material preferably is a polymer. The second material can be pore forming agents, structural components, biosensor, or molecules for release, such as drug. The device also can comprise a substrate and a plurality of microneedles extending from the substrate, wherein the microneedles have a beveled or tapered tip portion, a longitudinally extending exterior channel, or both. Methods of making these devices include providing a mold having a plurality of microdepressions which define the surface of a microneedle; filling the microdepressions with a first molding material; and molding the material, thereby forming microneedles.